Advisory Council on Science and Technology
Conseil consultatif des sciences et de la technologie

SUPPORTING DOCUMENT
14
EXECUTIVE SUMMARY

Training for Critical Skills

Prepared for the Expert Panel on Skills
by Costa Kapsalis
Data Probe Economic Consulting Inc.

August 1999

Canada

Objective of Study

This study presents training statistics on selected sectors of the Canadian economy and on key occupations relevant to these sectors. It is based on the Statistics Canada's *Adult Education and Training Survey (AETS)* for 1997 and 1993. The five sectors include: aerospace, automotive, information and telecommunications technologies, bio-pharmaceuticals and bio-technologies in agriculture, aquaculture, and forestry; and environmental technologies.

Level of Training Effort

The incidence of training is high, especially in information and telecommunication technologies: In particular, 56 percent of the employees in information and telecommunication technologies took training in 1997, compared to 41 percent across all sectors. Automotive and aerospace, on the other hand, were below the national rate, while the sample for the remaining two sectors was too small for reliable statistics.

Employer training is more prevalent than own training: This is true also for the economy as a whole, but the balance is more skewed in the case of the selected sectors and occupations: the incidence of employer training was at least double the incidence of own training.

Employer training, though, is mostly short-term: Half of the trainees in information/telecommunications received less than 30 hours of employer training in 1997. The hours of employer training were less in the rest of the sectors and the national level.

Employer training up since 1993: Across the whole economy, employer training is up since 1993 (a result of an improving economy) while own training is down (a reflection of the fact that job availability has improved since 1993).

There appears to be a trend toward equalization in the distribution of training: Over the period 1993 to 1997 there has been a decline in employer training among managers, engineers and technicians/technologists, and an increase among skilled trades and assembly workers. The former three occupations still have a considerably higher incidence of training than the latter two occupations.

Adequacy of Employer Training

Most employees feel employer training is adequate: Two-thirds to three-quarters of employees in the selected sectors and occupations reported that employer training is adequate. The rate is up since 1993.

But unmet demand for training still significant: About one-quarter of employees in the selected sectors and across the whole economy reported that they needed or wanted more training in 1997. This indicates that there is still a considerable amount of unmet need for training. The three most commonly reported barriers to taking more training were: too busy at work, courses available at inconvenient time; and course too expensive or employee lacks money.

Employees often the driving force behind employer training: Those who received employer training were also more likely to have taken training on their own, report that employer training is not adequate, or that they need or want more training. This suggests strongly that in many cases employers play a facilitating role, but the driving force behind training are employees themselves. This means that much more attention needs to be paid directly to employees – e.g., in terms of promotion campaigns or financial incentives.

What Types of Training Work Best

Majority of employees satisfied with the employer courses, but there is significant room for improvement: In 39 percent of the cases, employer courses met only somewhat or less employee expectations. Also, in 44 percent of the cases, the acquired skills were used only somewhat or less frequently at the work place.

Policy Implications

Governments and industry should reach out to employers and employees: Since employees themselves have a significant influence on employer training, it is important that workplace training is promoted by reaching out to employers and employees alike.

Employers, training institutions and governments can address common barriers to training:

- Employers can encourage more training by providing employees more flexibility with work schedules and time off with pay to take job-related courses and programs;

- training institutions can introduce more flexibility in the scheduling of courses (including offering courses in the evening and weekends) and new modes of delivery of training (including the internet and teleconferencing) to deal with the time constraints of full-time employees;

- governments can explore new ways to ease the financial burden of training among employees.

Need to explore what types of training work best: Much of the focus has concentrated on the level of training effort, as opposed how effective are the billions invested in employee training annually. While training appears to work out for most trainees, there is room for improvement. This is an area of research where industry associations and government can make a contribution.

Conseil consultatif des sciences et de la technologie
Advisory Council on Science and Technology

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Acquisition des compétences essentielles

Préparé pour le Groupe d'experts sur les compétences
par Costa Kapsalis
Data Probe Economic Consulting Inc.

Août 1999

Canada

101-00132/

Objectif de l'étude

Basée sur l'*Enquête sur l'éducation et sur la formation des adultes (EEFA)* de Statistique Canada pour 1997 et 1993, la présente étude a pour objet de présenter des statistiques sur la formation dans les secteurs sélectionnés de l'économie canadienne et dans les principales professions qui s'y rattachent. Les cinq secteurs faisant l'objet de l'étude sont les suivants : l'aérospatiale; l'automobile; les technologies de l'information et des télécommunications; la biopharmaceutique et les biotechnologies dans les domaines de l'agriculture, de l'aquiculture et de la foresterie; et les technologies environnementales.

Niveau d'effort de formation

La fréquence de la formation est élevée, surtout dans les technologies de l'information et des télécommunications : Plus particulièrement, en 1997, 56 pour cent des employés dans le secteur des technologies de l'information et des télécommunications ont suivi des cours de formation, par rapport à 41 pour cent dans l'ensemble des secteurs. Par contre, les industries de l'automobile et de l'aérospatiale ont inscrit des taux inférieurs à la moyenne nationale. En ce qui concerne les deux autres secteurs, leur échantillon était trop petit pour en dégager des statistiques fiables.

La formation assurée par l'employeur est plus courante que la formation assurée par soi-même : Il en est ainsi pour l'économie dans son ensemble, mais cette situation est plus asymétrique dans le cas des secteurs et des professions sélectionnés : la fréquence de la formation assurée par l'employeur était, au moins, deux fois plus élevée que celle de la formation assurée par soi-même.

Toutefois, la formation assurée par l'employeur se fait généralement à court terme : En 1997, la moitié des employeurs en formation dans le secteur des technologies de l'information et des télécommunications avaient reçu moins de 30 heures de formation assurée par leur employeur. Dans les autres secteurs et au niveau national, le nombre d'heures de formation assurée par l'employeur était inférieur à ce chiffre.

La formation assurée par l'employeur est en hausse depuis 1993 : Dans l'ensemble de l'économie, la formation assurée par l'employeur a inscrit une hausse depuis 1993 (le résultat d'une économie dont la performance s'améliore) alors que la formation assurée par soi-même est en baisse (la conséquence de l'augmentation des débouchés depuis 1993).

La tendance à l'équilibrage semble se manifester dans la répartition de la formation : Au cours de la période de 1993 à 1997, la formation assurée par l'employeur a subi une baisse auprès des gestionnaires, des ingénieurs et des techniciens/technologies, alors qu'elle a connu une croissance parmi les gens de métier et les travailleurs à la chaîne. Néanmoins, les trois premières professions

enregistrent quand même une fréquence de formation nettement plus élevée que les deux dernières professions.

Pertinence de la formation assurée par l'employeur

La plupart des employés croient que la formation assurée par leur employeur est adéquate : Selon les deux tiers à trois quarts des employés dans les secteurs et les professions sélectionnés, la formation assurée par leur employeur était adéquate. Ce taux est en hausse depuis 1993.

Mais il existe toujours une part considérable de la demande de formation qui n'est pas satisfaite : En 1997, environ le quart des employés dans les secteurs sélectionnés et dans l'ensemble de l'économie ont signalé qu'ils avaient besoin de plus de formation ou qu'ils voulaient en recevoir davantage. Cela indique qu'il existe toujours un niveau considérable de besoins non satisfaits pour la formation. Voici les trois obstacles à la formation que l'on a cités le plus souvent : le fait d'être trop occupé au travail; le fait que les cours ne soient pas offerts à des heures convenables; et le fait que les cours soient trop dispendieux ou que l'employeur ne puisse se permettre de les payer faute d'argent.

Les employés sont souvent la force motrice à l'origine de la formation assurée par l'employeur : Les employés ayant reçu une formation par leur employeur avaient également plus de chance d'avoir suivi une formation par soi-même, de signaler que la formation assurée par l'employeur n'était pas adéquate ou de déclarer qu'ils avaient besoin de plus de formation ou qu'ils voulaient en recevoir davantage. Cela laisse entendre que, dans de nombreux cas, les employeurs jouent un rôle d'auxiliaires, mais que la force motrice à l'origine de la formation constitue les employés eux-mêmes. Cela signifie qu'il faut porter une plus grande attention directement aux employés – p. ex., au chapitre des campagnes promotionnelles ou des stimulants financiers.

Les types de formation qui fonctionnent le mieux

La plupart des employés étaient satisfaits des cours offerts par leur employeur, mais il reste encore beaucoup à améliorer dans ce domaine : Dans 39 pour cent des cas, les cours offerts par l'employeur ont quelque peu satisfait aux attentes des employés. De plus, dans 44 pour cent des cas, les compétences acquises n'ont été utilisées que plus ou moins fréquemment en milieu de travail.

Incidences politiques

Les gouvernements et l'industrie doivent tisser des liens avec les employeurs et les employés : Puisque les employés exercent eux-mêmes une grande influence sur la formation assurée par l'employeur, il est important de promouvoir la formation en milieu de travail en tissant des liens avec les employeurs et les employés.

Les employeurs, les établissements de formation et les gouvernements peuvent surmonter des obstacles communs à la formation :

- Les employeurs peuvent encourager plus de formation en faisant preuve d'une plus grande souplesse dans les horaires de travail des employés et en offrant à ces derniers du temps libre rémunéré pour suivre des cours ou des programmes liés à l'emploi;

- les établissements de formation peuvent introduire plus de souplesse dans le calendrier des cours (par exemple, offrir des cours en soirée et en fin de semaine) et se servir de nouveaux modes de prestation en matière de formation (notamment, les cours offerts sur Internet et la téléconférence) afin de faire face aux contraintes temporelles des employés à temps plein;

- les gouvernements peuvent étudier de nouvelles façons d'alléger le fardeau financier en matière de formation pour les employés.

Il est nécessaire d'étudier les types de formation qui fonctionnent le mieux : On a placé l'accent en grande partie sur le niveau d'effort de formation, plutôt que sur le degré d'efficacité des milliards de dollars investis annuellement dans la formation des employés. Bien que la formation semble porter fruit pour la plupart des employés, il y a toujours matière à amélioration. Il s'agit d'un domaine de recherche où les associations industrielles et le gouvernement peuvent faire une contribution.

Advisory Council on Science and Technology
Conseil consultatif des sciences et de la technologie

SUPPORTING DOCUMENT 14

Training for Critical Skills

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by Costa Kapsalis
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Canada

TRAINING FOR CRITICAL SKILLS

Prepared for the:
Expert Panel on Critical Skills

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Data Probe Economic Consulting Inc.

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Executive Summary

Introduction

This study presents training statistics on selected sectors of the Canadian economy and on key occupations relevant to these sectors. The study is based on the Statistics Canada's Adult Education and Training Survey (AETS) for 1997 and 1993. The selected five sectors are:

- aerospace;
- automotive;
- information and telecommunications technologies;
- bio-pharmaceuticals and bio-technologies in agriculture, aquaculture, and forestry; and
- environmental technologies.

Level of Training Effort

The incidence of training is high, especially in information and telecommunication technologies: In particular, 56% of the employees in information and telecommunication technologies took training in 1997, compared to 41% across all sectors. Automotive and aerospace, on the other hand, were below the national rate, while the sample for the remaining two sectors was too small for reliable statistics.

Employer training is more prevalent than own training: This is true also for the economy as a whole, but the balance is more skewed in the case of the selected sectors and occupations: the incidence of employer training was at least double the incidence of own training.

Employer training, though, is mostly short-term: Half of the trainees in information/telecommunications received less than 30 hours of employer training in 1997. The hours of employer training were less in the rest of the sectors and the national level.

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Most employees feel employer training is adequate: Two-thirds to three-quarters of employees in the selected sectors and occupations reported that employer training is adequate. The rate is up since 1993.

But unmet demand for training still significant: About one-quarter of employees in the selected sectors and across the whole economy reported that they needed or wanted more training in 1997. This indicates that there is still a considerable amount of unmet need for training. The three most commonly reported barriers to taking more training were:

- too busy at work
- courses available at inconvenient time; and
- course too expensive or employee lacks money.

Employees often the driving force behind employer training: Interesting enough, those who received employer training were also more likely to have taken training on their own, report that employer training is not adequate, or that they need or want more training. This suggests strongly that in many cases employers play a facilitating role, but the driving force behind training are employees themselves. This means that much more attention needs to be paid directly to employees -- e.g., in terms of promotion campaigns or financial incentives.

What Types of Training Work Best

Majority of employees satisfied with the employer courses, but there is significant room for improvement: In 39% of the cases, employer courses met only somewhat or less employee expectations. Also, in 44% of the cases, the acquired skills were used only somewhat or less frequently at the work place. Among specific findings:

- Employer courses are more likely to be used at work if they are provided directly by the employer; in that regard, educational institutions appear more successful than commercial schools.
- Employer courses are more likely to meet employee expectations when employees themselves suggested the training.
- Longer-term employer courses are more likely to be provide skills that are greatly used at work, as well as meeting to a great extent the expectations of the employees.

Policy Implications

Governments and industry should reach out to employers and employees: Since employees themselves have a significant influence on employer training, it is important that workplace training is promoted by reaching out to employers and employees alike.

Employers, training institutions and governments can address common barriers to training: For example:

- employers can encourage more training by providing employees more flexibility with work schedules and time off with pay to take job-related courses and programs;
- training institutions can introduce more flexibility in the scheduling of courses (including offering courses in the evening and weekends) and new modes of delivery of training (including the internet and teleconferencing) to deal with the time constraints of full-time employees;
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Introduction

The Expert Panel on Skills was established by the Advisory Council on Science and Technology to provide independent, expert advice on the critical skills needed in a number of sectors of industry where Canada is strong already or where opportunities for economic growth and for job creation are high. These sectors are:

- aerospace;
- automotive;
- information and telecommunications technologies;
- bio-pharmaceuticals and bio-technologies in agriculture, aquaculture and forestry; and
- environmental technologies.

There is growing recognition that skills development is a lifelong process. Employees enter the labour force with an initial "stock" of human capital acquired primarily through their initial formal education. Over their working lives, employees maintain and upgrade their education "stock" through a "flow" of training, reinforced by practical experience. Put simply, in the same way that physical capital needs continuous investment to replace what has been depreciated and meet new production requirements, employees also need an on-going flow of training investment to maintain and upgrade their human capital.[1]

The objective of this study is to explore potential training issues within the selected five sectors and occupations critical to these sectors. The main questions addressed by the study are:

- Level of training effort: How much training takes place? how does it compare to the rest of the industries? how has the level of training changed in the last few years?
- Adequacy of employer training: how adequate is the current level of employer training? do employees think that they need more training? and if they do, what are the barriers to taking more training? how perceptions of adequacy of employer training change over time?
- What types of training works best? does the type of training received by employees meet their expectations? are the acquired skills used at work? which types of training are most effective?

The study is based on the Statistics Canada's Adult Education and Training Survey (AETS) for 1997 and 1993. Following this introduction, Section 2 describes briefly the AETS, while Section 3 defines the sample used for the analysis and discusses certain methodological issues. The key questions raised by this study are addressed by the following three sections: level of training effort (Section4); adequacy of employer training (Section 5); and what types of training works best (Section 6). Section 7 concludes the study.

[1] See C. Kapsalis, Employee Training: An International Perspective, Statistics Canada, Catalogue no. 89-552-MPE, no.2, 1997.

About the AETS

The AETS provides the most comprehensive account so far of the education and training activities of adult Canadians. The survey makes no distinction between education and training. In this study, the term training refers to both education and training. The AETS organizes education and training activities into programs and courses: [2]

- Programs: They refer to education and training leading to: an elementary/high school diploma; an apprenticeship certificate; a trade/vocational diploma or certificate; a college diploma; or a university degree.
- Courses: They refer to education and training not leading to a degree, diploma, or certificate. Courses can be given in the form of in-classroom courses, workshops, seminars or tutorials.

Programs and courses are classified into employer-sponsored and non-employer-Sponsored education and training.

- Employer training: It refers to training that was sponsored or financial supported by the employer. Employer training may involve the direct provision of training, paying for tuition or fees, providing time-off or educational leave, or paying for course materials, transportation, or other related costs.
- Own training: It refers to training taken by employees on their own without any employer support. Typically the cost of such training is financed by the individual, although in some cases may involve support by a government program or a union or professional association.

The AETS provides detailed information on each particular training activity -- such as, the subject area, the type of support provided by the employer, where and how the activity tool place and the duration of training. The AETS also provides detailed information on respondents' views about the adequacy of training or the need for more training, as well as detailed information about the profile of respondents (such as gender, age, education, employment status, industry, occupation, job tenure, union membership, and size of employer).

The most recent AETS was conducted in January 1988 and collected information on the education and training activities of adult Canadians in 1997. The survey was conducted as a supplement to the January 1997 Labour Force Survey and was funded by Human Resources Development Canada. It involved a representative sample of 33,410 Canadians, aged 17 and over.

[2] The AETS captures only structured (formal) training in the form of programs and courses, and it ignores on-the-job (informal) training.

Sample Selection

The focus of the study is on employees within the selected five sectors or within a number of occupations that are critical to these sectors. The analysis is conducted both at the sectoral and occupational level. The selection of the sample has been influenced by the need to exceed a minimum size for statistical reliability. In most cases we have adopted as a minimum sample size 100 respondents.[3]

Sectoral Analysis

The Panel on Critical Skills has focussed on five key sectors (Table 1). The AETS sample was sufficiently large for producing reasonably accurate statistics for two of the five sectors:

- automotive; and
- information/ telecommunication technologies.[4]

The sample was limited in the case of aerospace. Charts for this sector are shown using a white bar to remind the reader of the sample limitation.[5]
Finally, the sample was not sufficient for producing any statistics for the remaining two sectors: biotechnology and environmental industries.

Table 1: Number of Employees by Sector, 1997 (within the 5 selected sectors)

	Sample size	Estimated number
Aerospace	74	81,820
Automotive	293	278,753
Information/Telecom. Technologies	363	403,864
Biotechnology	36	41,461
Environmental Industries	33	27,335
Total	799	833,233

See Appendix A, Table X1 for definition of selected sectors.

[3] In the case of estimates of percentages (e.g. the incidence of training) the margin of error for a sample of 100 respondents is about plus or minus 10%, 19 out of 20 times. The actual margin of error will depend on the value of the estimated percentage, as well as the design effect of the survey.
[4] In the case of automotive and information/telecommunication technologies, the margin of error of an estimated percentage (e.g. the percentage of employees receiving employer training) is plus/minus 5 percentage points, 19 out of 20 times.
[5] The margin of error in the case estimates in the aerospace industry is plus/minus 11 percentage points.

Occupational Analysis

Six occupational groups were identified by the Panel as critical to the selected five sectors (Table 2). With the exception of scientists, the AETS sample was sufficient to analyze separately each of the remaining five occupational groups.[6]

In the analysis we have included all employees with the specific occupations, rather than only those who are working within the selected five sectors. The sample size does not permit to analyze *specific* occupations *within specific* sectors.[7] However, even if this was possible, it may not have been advisable. The reason is that all sectors draw from the same pool of occupations. What matters most is the quality of the available pool of critical occupations, regardless of the specific industry in which they happen to be employed at any particular point in time.[8]

Table 2: Number of Employees by Occupation, 1997 (within occupations relevant to the 5 selected sectors)

	Sample size	Estimated number
Managers (science/manufacturing)	332	284,830
Scientists (physics, chemistry, etc.)	36	20,041
Engineers (mechanical, telecom etc.)	345	360,351
Technicians and technologists	119	99,970
Skilleds trades (machining/tool making)	331	241,318
Assembly (aircraft/motor/plastics)	143	124,476
Total	1,306	1,130,986

See Appendix A, Table X2 for definition of relevant occupations.

[6] Virtually all the scientists in the AETS sample were occupied outside the selected five sectors. As a result, scientists were excluded from the analysis.

[7] Only in one case (sales and marketing managers) we restricted the sample to those working within the selected five sectors. The rationale was that this group is large and only about 4% is employed within the selected five sectors.

[8] This approach is further supported by the fact that a very high percentage of those who change jobs tend to also change industry.

Other Methodological Considerations

Typically, statistical estimates are subject to a margin of error because they are based on a random sample rather than a census of the total population. As a result, one of the questions that is often raised is whether observed differences between sectors are significant or whether they fall within the margin of error of estimation. We tested the main results of the study by applying a standard statistical test and used the results of the testing to qualify the findings accordingly.[9]

Another question that is often raised in this type of analysis is to what extent are inter-sectoral differences (e.g. differences in the incidence of training) due to differences in sector characteristics (e.g. occupational mix), as opposed to differences in training culture. For example, it is quite possible that two sectors provide the same level of training within occupation but, because they have a different mix of occupations, one sector provides overall more training than the other. This question was examined using regression analysis and the results were used to qualify the findings accordingly.[10]

Level of Training Effort

The basic question addressed in this section is: do employees in critical occupations receive more training than employees in the rest of the economy? The section looks into the level of training effort within the selected sectors and occupations, and compares it to the rest of the economy. Basic indicator of training effort include:

(a) the percentage of employees who participated in employer or own training (incidence); and
(b) the median hours of training (median is the number of hours below which fall half of all trainees).[11]

Incidence of Training

Charts 1a and 1b show the incidence among employees of any type of training (i.e. employer training or training taken by employees on their own), first by sector and then by occupation. The results by sector show that:

- In information and telecommunication technologies, 56% of employees participated in training in 1997, compared to 41% across all sectors (Chart 1a). The difference was statistically significant.

[9] The statistical significance of the difference of two means or percentages was tested using the standard t-test and the usual 95% level of confidence.

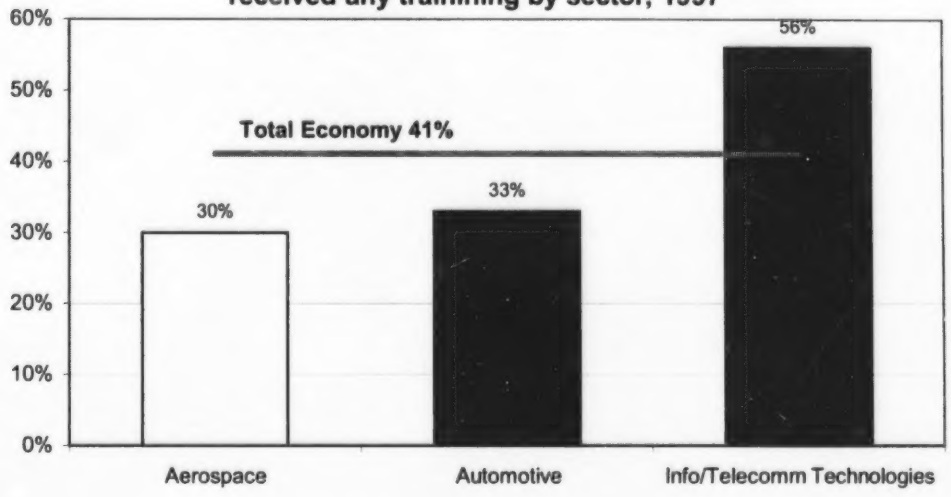
[10] The standard technique for the analysis of a rate, like the rate of incidence of training, is logit regression analysis. In the logit regressions we used as independent variables sector and occupation, but we did not control for other factors such as the size of the company or region.

[11] We used the median, rather than the average, hours of training because the median is not sensitive to extreme values and is, therefore, more representative of the typical hours of training.

- In automotive, 33% of employees participated in training, while the rate in aerospace was 30%. Statistically, in both cases the rate was significantly below the national rate.[12]
- The results by occupation show that:
- Engineers had the highest incidence of training (60%) followed by managers (48%). Statistically, in both cases the rate was significantly higher than the national rate (Chart 1b).
- Technicians and technologists had a somewhat higher incidence (46%) and skilled trades a somewhat lower incidence (38%) than the national rate. However, in both cases the difference from the national rate was within the margin of error.
- Assembly workers had a statistically significant lower incidence of training than the rest of the occupations examined here (16%).

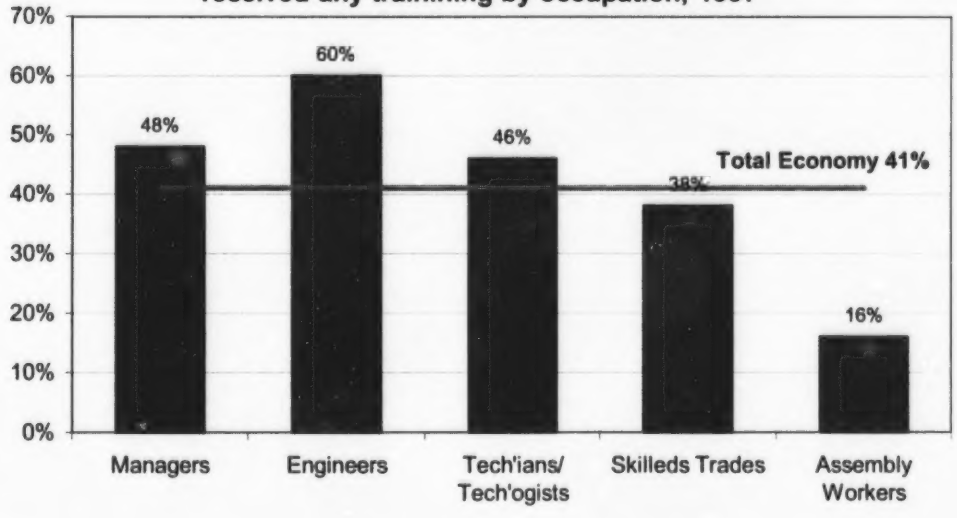
[12] Regression analysis suggests, however, that in both cases much of the gap from the national rate can be explained by differences in the occupational mix.

Chart 1a: Percentage of employees who received any trainining by sector, 1997



Aerospace estimate subject to wide margin of

Chart 1b: Percentage of employees who received any trainining by occupation, 1997

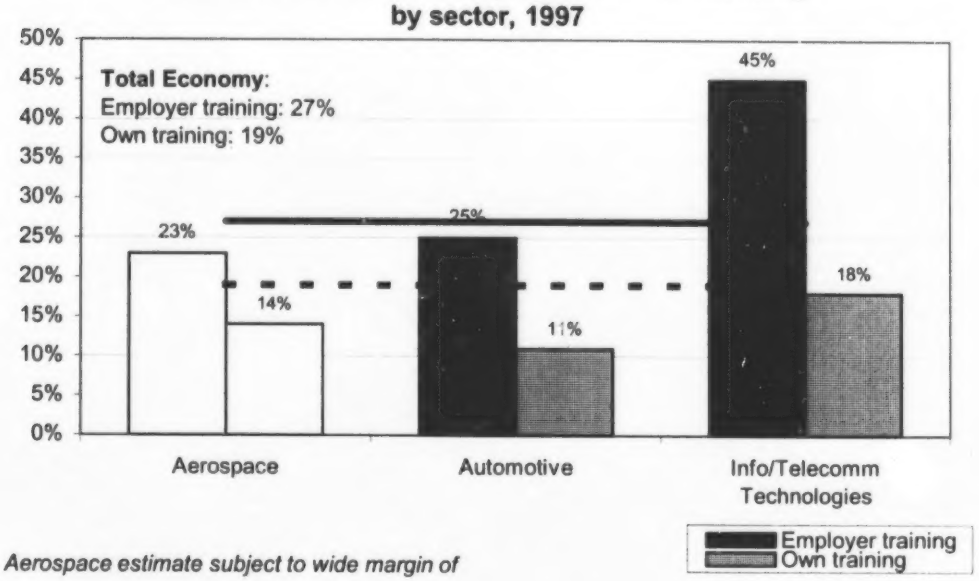


Incidence of Employer vs. Own Training

Charts 2a and 2b provide similar information to the previous two charts, except now a distinction is made between employer training and own training. The results show that:

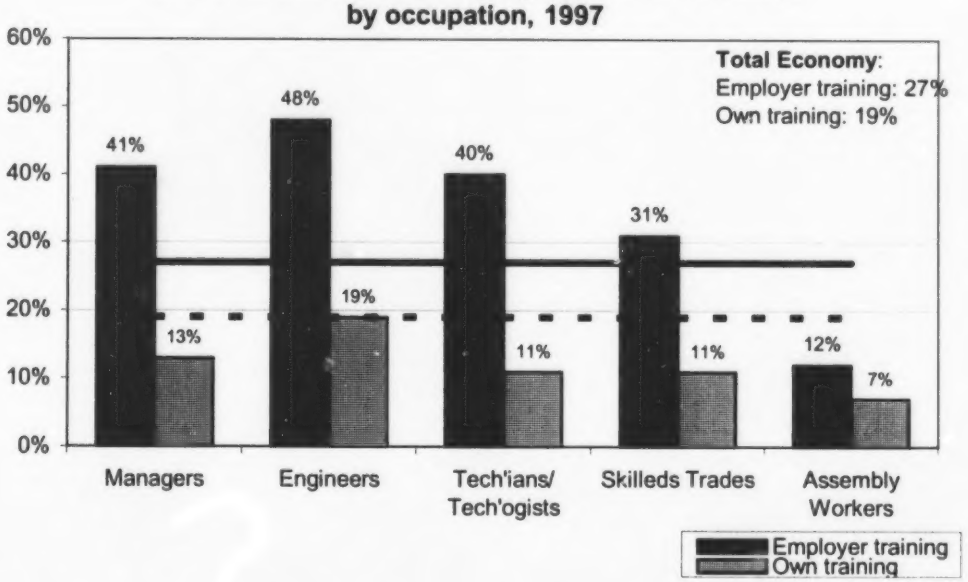
- Sectors with a high incidence of employer training tended to also have a high incidence of own training. This suggests that employees who need more training tend to get more training from their employer, as well as on their own. This aspect is probed in more detail in a following section.
- In all cases, employer training exceeded employee training. This was also true in the economy at large. However, in the case of the sectors and occupations examined here, the balance was more skewed towards employer training. In most cases, the incidence of employer training was double or more the incidence of own training.
- As a result, with the exception of assembly workers, all occupations relevant to the five sectors received more employer training than the national average for all employees. By contrast, with the exception of engineers, own training tended to be below the national average for all employees.

Chart 2a: Incidence of employer vs. own trainining by sector, 1997



Aerospace estimate subject to wide margin of

Chart 2b: Incidence of employer vs. own trainining by occupation, 1997



4.3 Median Hours of Employer Training

Table 3 compares the median hours of employer training across the selected sectors and occupations and compares them to the median hours in the overall economy. The reason for using median, rather than average, hours of training is that the former is not sensitive to extreme values and is, therefore, more representative of the typical hours of training.

The sample used for the estimation of hours of training is smaller than the sample used in the previous section, because hours are estimated only among those who participated in training. As a result, it was possible to produce reliable statistics only for employer training.

The results show that the median hours of employer training in automotive and in skilled trades were the same as for all employees in the economy. By contrast, the median hours were higher in the information/telecommunications sector and for engineers.

Table 3: Incidence and Median Hours of Employer Training, 1997

	Received training	Median hours
Sector		
Aerospace	23%	*
Automotive	25%	24
Information/Telecom. Technologies	45%	30
Occupation		
Managers (science/manufacturing)	41%	40
Engineers (mechanical, telecom etc.)	48%	30
Technicians and technologists	40%	*
Skilleds trades (machining/tool making)	31%	24
Assembly (aircraft/motor/plastics)	12%	*
Total Economy	27%	24

(*) Number of trainees too small for reliable estimation of the median hours of training.

Employer Training Across All Sectors and Occupations

Until this point, the selected sectors and occupations were compared to the average employee across the entire economy. In this section, the comparisons are expanded by using as comparators major sectors and occupational groups. The focus of the discussion is on employer training.

Table 4a shows that the incidence of employer training in information/ telecommunication technologies not only is above average, but it is also the highest of any of the sector groups in the economy. The median hours are also high; close to the top range among all sectors.

The incidence of employer training in automotive and aerospace is about average. However, compare to manufacturing (which is a more relevant comparator) the incidence is higher. At least in the case of automotive where the AETS sample is larger, the difference in incidence (25% vs. 21%) is statistically significant.

Table 4b provides similar comparisons by occupation. It shows that engineers and managers have the highest incidence of employer training and high median hours of training. However, these statistics are very similar to what one observes within the corresponding comparators -- physical scientist and engineers, and managers in general.

There is no clear comparator for the next two occupational groups. In the case of technicians and technologists, the incidence of employer training is close to that of physical scientists and engineers (40% vs. 45%). As for skilled trades, they place about half the way between physical scientists and engineers, and processing, machining, and fabricating occupations.

Finally, assembly occupations have the lowest incidence of any of the occupational groups examined here.

Table 4a: Employer Training by Sector Among All Employees in the Economy, 1997

	Received Training	Median Hours
Selected Sectors		
Aerospace	23%	*
Automotive	25%	24
Information/Telecom. Technologies	45%	30
All Sectors		
Primary	30%	30
Manufacturing	21%	28
Construction	20%	*
Utilities/ Transportation	34%	24
Trade	20%	24
Finance/ Insurance/ Real estate	40%	32
Education/ Health/ Welfare	34%	18
Business services	19%	30
Public administration	44%	30
All Sectors	27%	24

(*) Fewer than 100 trainees

Table 4b: Employer Training by Occupation Among All Employees in the Economy, 1997

	Received Training	Median Hours
Selected Occupations		
Managers (science/manufacturing)	41%	40
Engineers (mechanical, telecom etc.)	48%	30
Technicians and technologists	40%	*
Skilleds trades (machining/tool making)	31%	24
Assembly (aircraft/motor/plastics)	12%	*
All Occupations		
Managerial/ Adninistrative	41%	30
Natural scineces/ Engineers	45%	30
Social sciences	48%	18
Religion/ Art	16%	*
Teaching	33%	18
Health	35%	18
Clerical	23%	18
Sales	23%	25
Service	18%	33
Primary	27%	*
Processing/ Machining/ Fabricating	19%	24
Construction trades	22%	18
Transportation/ Material handling	17%	18
All Sectors	27%	24

(*) Fewer than 100 trainees

Trends in Training Effort

Among All Employees in the Economy

This section compares the incidence and hours of training between 1997 and 1993. The main motivation of the comparison is to see if in fact employers and employees have responded to the presence of critical skills by increasing the level of training effort.

To some extent, training trends within the selected sectors and occupations reflect trends in the whole economy. Therefore, it is constructive to begin the discussion with a review of training trends among all employees in the economy. Table 4 shows the incidence of training and median hours of training in both years.

Table 5: Comparison in Training Effort Among All Employees in the Economy, 1993-97

	1993	1997
Incidence of Training		
Any	43%	41%
Employer	24%	27%
Own	25%	19%
Median Hours of Training		
Any	48	40
Employer	24	24
Own	85	85

Note: The median hours for both employer and own training remained unchanged between the two years. This means that trainees in the middle of the distribution received the same hours of training from their employer and on their own in both years. However, because the balance of training shifted in favour of employer training (which typically involves fewer hours than own training), the median hours for all training hours dropped.

In more detail, Table 4 shows that:

- Between 1993 and 1997, the incidence of employer training among all employees increased from 24% to 27%. The trend is, at least in part, explained by the fact that the economy has improved over the period examined and employers generally tend to spend more on training when the economy is better.
- Over the same period, the incidence of own training declined from 25% to 19%. This result is not surprising. We know from enrolment statistics that individuals are less likely to enroll in courses when the employment situation improves. Another possible factor is that part of own training may have been replaced by the increase in employer training.
- The median hours of training remained unchanged between the two years, while the average hours for both employer and own training increased. The difference in trends between median and average hours is due to the fact that the median is not sensitive to high and low values.

Among Employees in the Selected Sectors and Occupations

Charts 3a and 3b compare the incidence of employer and own training between 1993 and 1997. The comparison relates to two of the five selected sectors; the sample for the remaining three sectors was too small for producing reliable statistics. The comparison also relates to five occupations that are relevant to the selected five sectors. The results show that:[13]

- The incidence of employer and own training increased in the automotive and information/telecommunication sectors. However, the increase in all cases was within the margin of error of statistical estimates.
- By contrast, the incidence of employer and own training decreased among managers, engineers, and technicians and technologists. Only in the case of managers, however, the decline was statistically significant.
- Among the remaining two occupations (skilled trades and assembly workers) the incidence of training remained the same or increased. However, in both cases the increase was not statistically significant.

Given the sample limitations, we can only provide an educated guess as to the nature of the trends:

- Most likely, employer training within the automotive and information/ communications sectors increased, something that parallels national trends.
- Own training within the two sectors may have also increased, or at least not decreased, contrary to the declining trend at the national level.
- The decline in employer training among manager, engineers and technicians/technologists may indicate some trend toward equalization in the distribution of training; these three occupations still have a considerably higher incidence of training than skilled trades and, in particular, assembly workers.

[13] Because of sample limitations, it is not possible to produce reliable estimates of the change in the median hours of employer and own training between 1973 and 1997.

Chart 3a: Change in incidence of employer training: 93-97
(within 2 sectors & 5 occupations relevant to all 5 sectors)

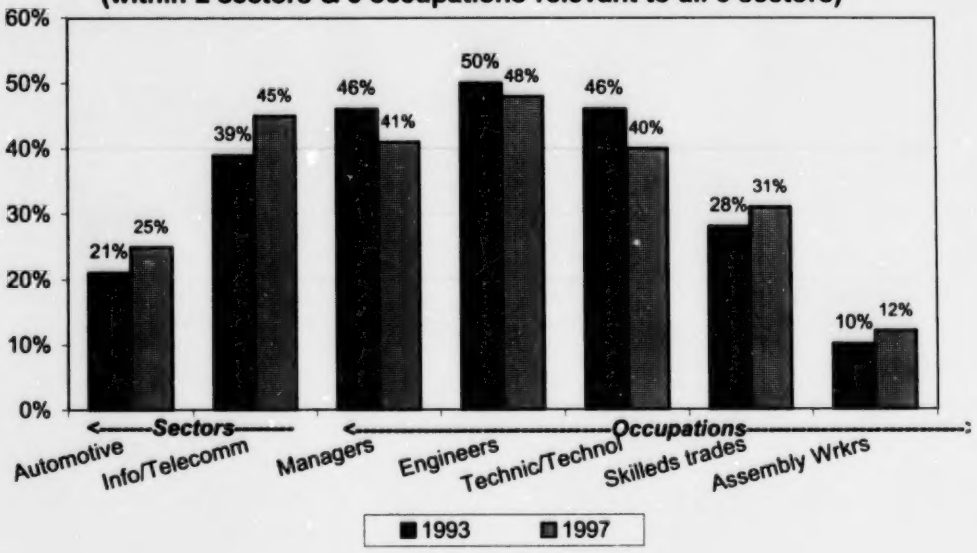
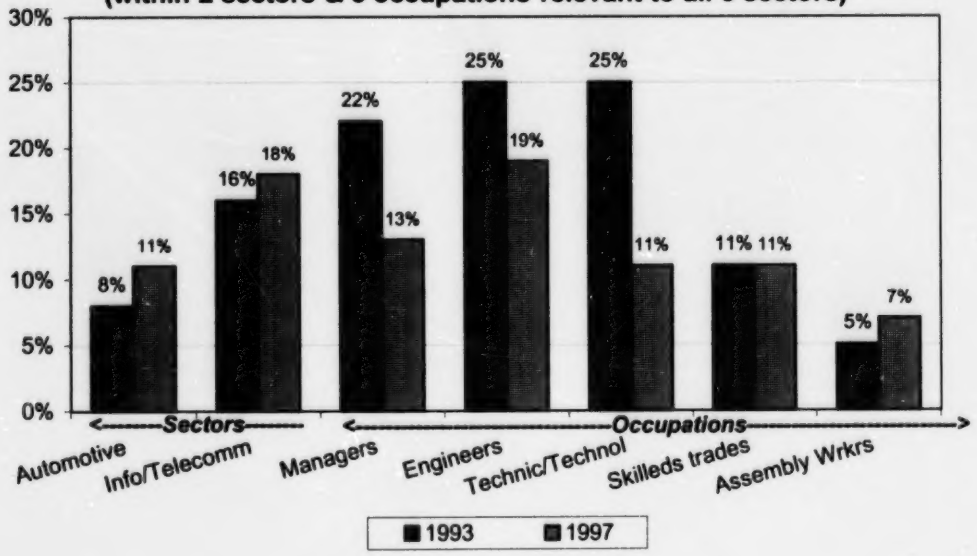


Chart 3b: Change in incidence of own training: 93-97
(within 2 sectors & 5 occupations relevant to all 5 sectors)



Adequacy of Employer Training

This section examines employees perceptions of the adequacy of their training, particularly that provided through their employers. The basic question addressed here is the following: is the current level of employer training perceived by employees to be adequate or is there a significant amount of unmet demand for training. The section looks at the following three specific aspects:

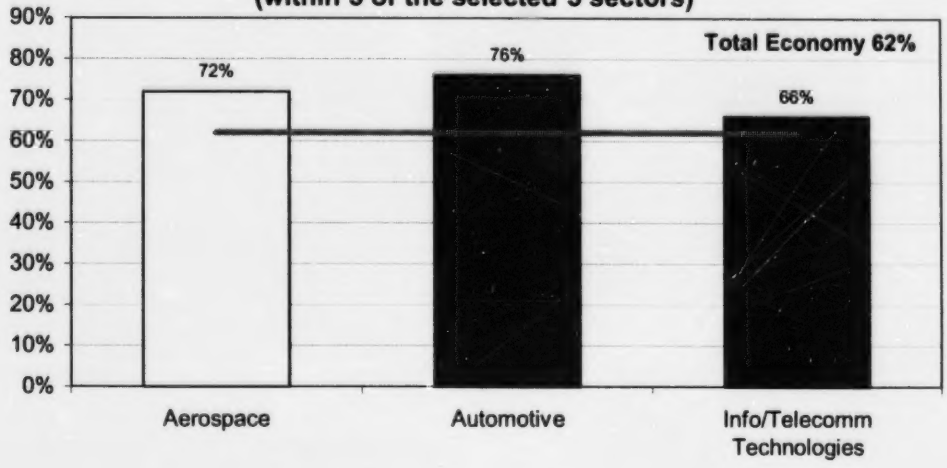
(a) the percentage of employees who felt that the amount of training provided by their employer to them and to their co-workers is adequate;
(b) the percentage of employees who needed or wanted more training; and
(c) the reasons why employees did not take training that they needed or wanted.

Employee Perceptions of Adequacy

Charts 4a and 4b show what percentage of employees reported that the training provided by their employer to them and to their co-workers in 1997 was adequate or very adequate. The results show that:

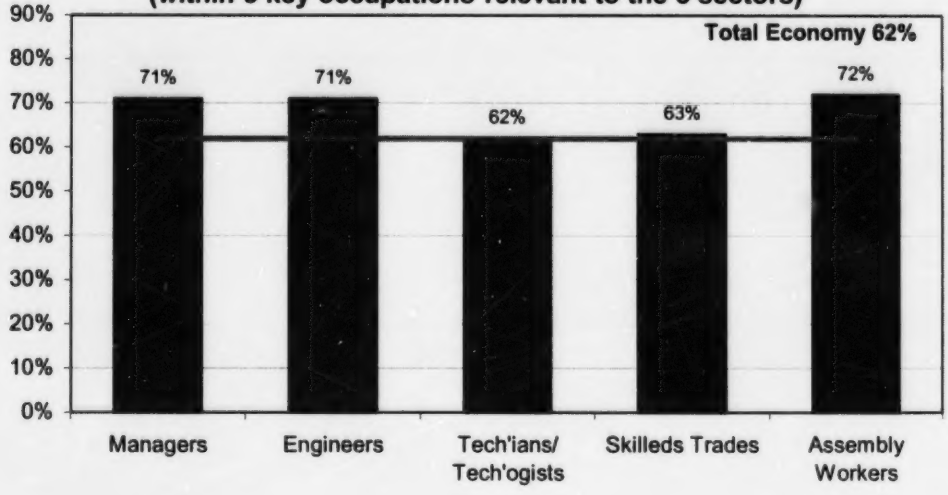
- The majority of employees reported that employer training was adequate. Statistically, the rate in aerospace and automotive was significantly higher than the national average. This was also the case among the following occupations: managers, engineers, and assembly workers.
- A seemingly paradoxical result is that assembly workers, who received the least amount training, gave the most favourable rating of employer rating. By contrast, employees in information and telecommunication technologies, who had the highest incidence of employer training, gave the least favourable rating of employer rating among the three sectors. This apparent paradox is addressed in more detail in the following section.

Chart 4a: Do you feel the training provided by your employer to you & your co-workers in 1997 was adequate? (within 3 of the selected 5 sectors)



Aerospace estimate subject to wide margin of

Chart 4b: Do you feel the training provided by your employer to you & your co-workers in 1997 was adequate? (within 5 key occupations relevant to the 5 sectors)



Need or Want for More Training

The discussion of the previous section is now being complemented by looking at the percentage of employees who reported that they needed or wanted more training in 1997, but did not take it (Charts 5a and 5b).[14] The results indicate the following:

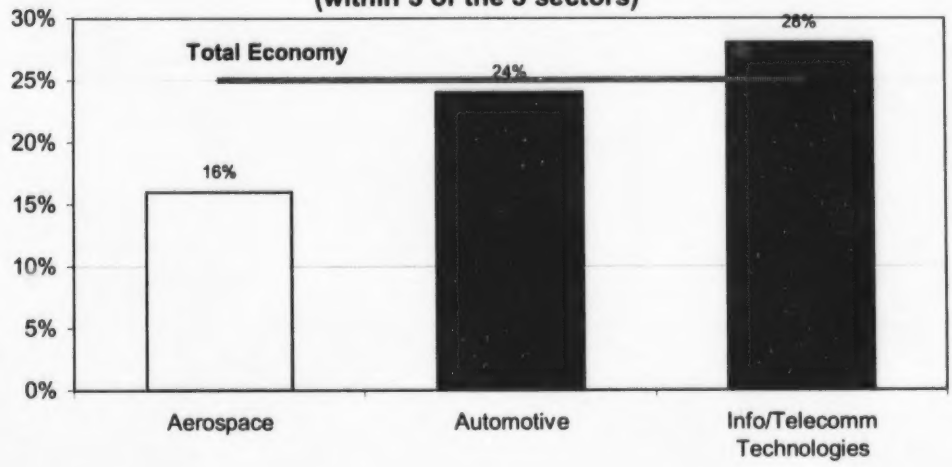
- Paradoxically, again, employees in information and telecommunication technologies, despite the fact that they had the highest incidence of training, reported the highest rate of need for more training.
- By contrast, assembly workers, who had the lowest incidence of training of any occupation, reported the lowest rate of need for more training.

So what we are finding is that those who receive more employer training tend to also:

- take more training on their own;
- feel that employer training is not adequate; and
- report that they need or want more training.

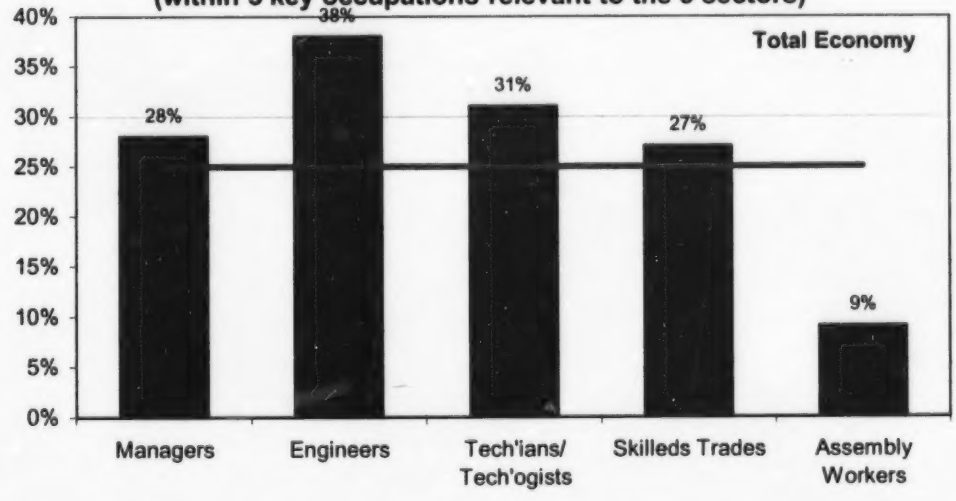
[14] AETS respondents were asked two related questions: "At any time during 1997, was there any training or education that you NEEDED to take for job-related or career reasons but did not?" and "At any time in 1997, were there any job-related, hobby, recreational or interest courses you WANTED to take but did not?" The percentage responding positively was greater in the question. One reason is that the second question defines training more broadly. However, as other research has shown, a main reason for the difference is that WANTED more training has a positive connotation, while NEEDED more training suggests that the respondents is lacking training.

Chart 5a: Was there any training that you needed or wanted to take in 1997 for job or other reasons but did not? (within 3 of the 5 sectors)



Aerospace estimate subject to wide margin of

Chart 5b: Was there any training that you needed or wanted to take in 1997 for job or other reasons but did not? (within 5 key occupations relevant to the 5 sectors)

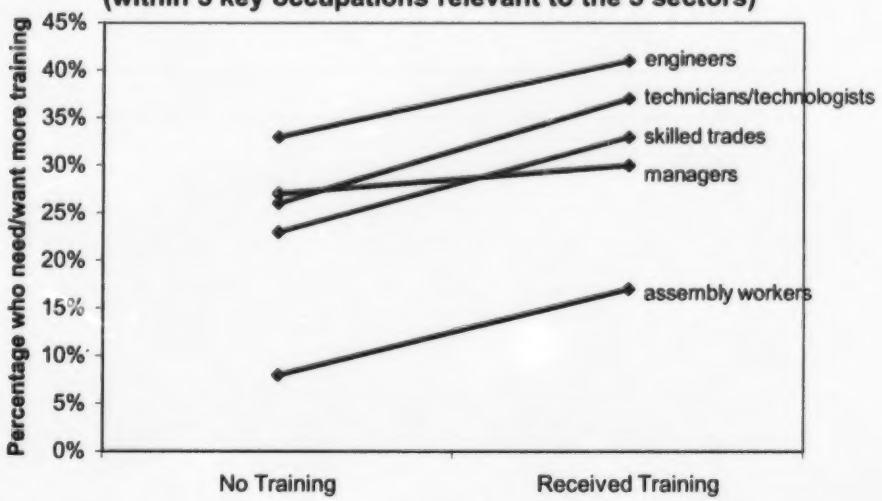


The above point is better illustrated by Chart 6. The chart shows that within the same occupation, those who received training in 1997 (from their employer or on their own), were more likely to also report that they needed or wanted more training.

These findings are consistent with those of a previous study that found that "there is evidence that in many cases employers play a facilitating role and the driving force [behind training] are employees themselves." One of the conclusion of that that study was that "even when we talk about workplace training, much more attention needs to be paid directly to employees -- e.g., in terms of promotion campaigns or financial incentives." [15]

An additional explanation of the high incidence of unmet demand for training in information/telecommunication technologies is that sector is facing a chaotic environment and technology is changing at very rapid rate. As a result, there is a constant nee for skills upgrading, compared to the more mature sectors -- such as automotive.

Chart 6: Relation between participation in training and needed or wanted more training in 1997 (within 5 key occupations relevant to the 5 sectors)



[15] C. Kapsalis: "The Role of Employees in Training Decisions in Canada." Canadian Business Economics, Vol. 5, No. 1, Fall 1996.

Barriers to Training

Table 5 list the barriers to more training reported by employees who needed or wanted more training in 1997. The analysis is restricted to the sample of employees who reported that they needed or wanted more training. As a result of the restriction of the sample, reliable statistics were possible only for the information/telecommunications sector and two occupations: managers and engineers.

The ranking of factors was fairly similar across the one sector, the two occupations, and the economy at large.

- The three most common barriers were too busy at work, inconvenient time that courses are offered and financial reasons.
- In the middle group of reported frequency were family responsibilities, course not offered and lack of employer support.
- Finally, less important barriers were lack of child support, lack of sufficient qualifications, health reasons, and language reasons.

Table 6: Barriers to Not Taking Training that Employees Needed or Wanted to Take, 1997

	Information/ Telecom. Technolog's	Managers	Engineers	Employes in entire economy
Too busy at work	64%	82%	63%	59%
Incovenient time	44%	41%	39%	46%
Expensive/no money	30%	23%	20%	38%
Family responsibilities	16%	17%	13%	19%
Course not offered	15%	14%	20%	17%
Lack of employer support	23%	15%	16%	16%
Lack of child care	6%	1%	6%	9%
Lack of qualifications	2%	1%	2%	4%
Health Reasons	1%	1%	1%	3%
Language reasons	0%	0%	0%	1%

The above results suggest that both employers and educational institutions can have a positive influence on the level of training:

- Employers could help overcome some of the barriers to training by providing time off for training or subsidizing the cost of training.
- Institutions could help overcome some of the barriers by providing wider choice of time of delivery of courses, or using new, more flexible methods of delivery, such as the Internet.

Trends in Adequacy of Employer Training

All signs point to an improvement in the adequacy of employer training over the period 1993-97. In addition to the reported increase in employer training discussed earlier, there are two more favourable signs:

- the percentage of employees who feel that their employer's training is adequate or very adequate increased from 53% to 62%; while,
- the percentage of employees who reported that they needed or wanted more training declined from 36% to 25%.

The above trends are mirrored in the trends within the selected sectors and occupations that are the focus of this study. In all cases, the perception of adequacy went up, while the perception of need or want for more training went down.

Chart 7: Change in the percentage of employees reporting that employer training was adequate/very adequate: 93-97 (within 2 sectors & 5 occupations relevant to all 5 sectors)

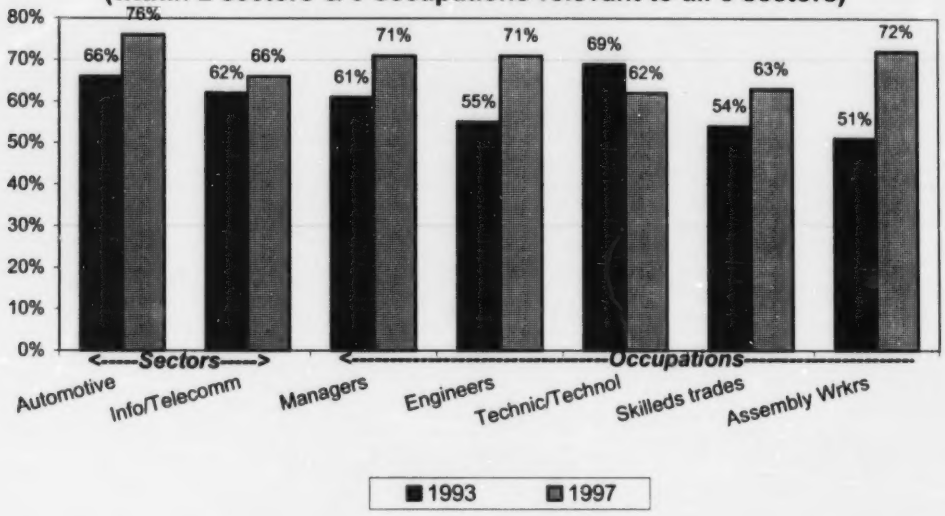
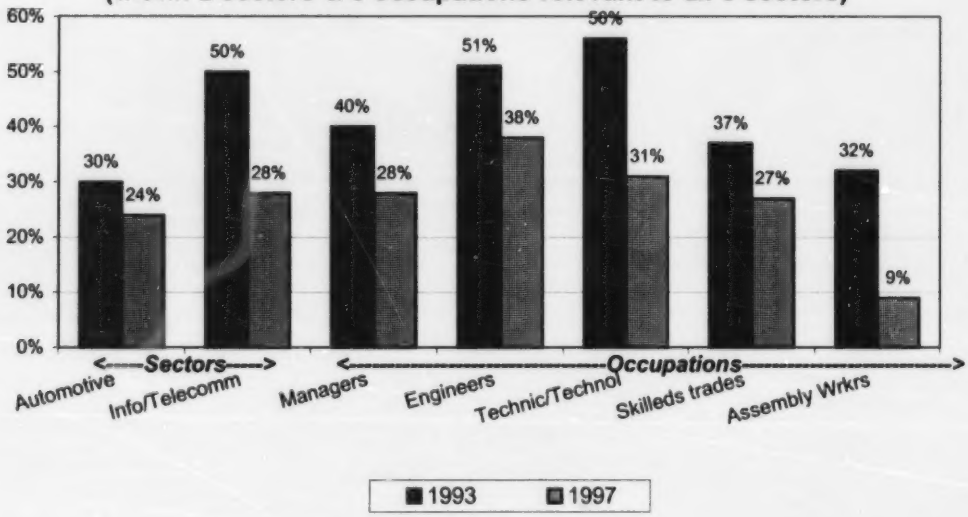


Chart 8: Change in the percentage of employees who need or want more training: 93-97 (within 2 sectors & 5 occupations relevant to all 5 sectors)



What Types of Training Works Best

Employee training involves the investment of considerable resources, both financial and time, by employers, employees and society at large. One issue is how effectively are training resources being invested. This is an important issue since improvement of employee training is not simply a question of how much money is being invested on training, but also how effectively training funds are used.

This section attempts to identify how effective is training within the selected sectors or occupations. It addresses the following specific questions:

- did the current types of training meet the employees' expectations?
- were the acquired skills used at work? and,
- which types of training were more effective?

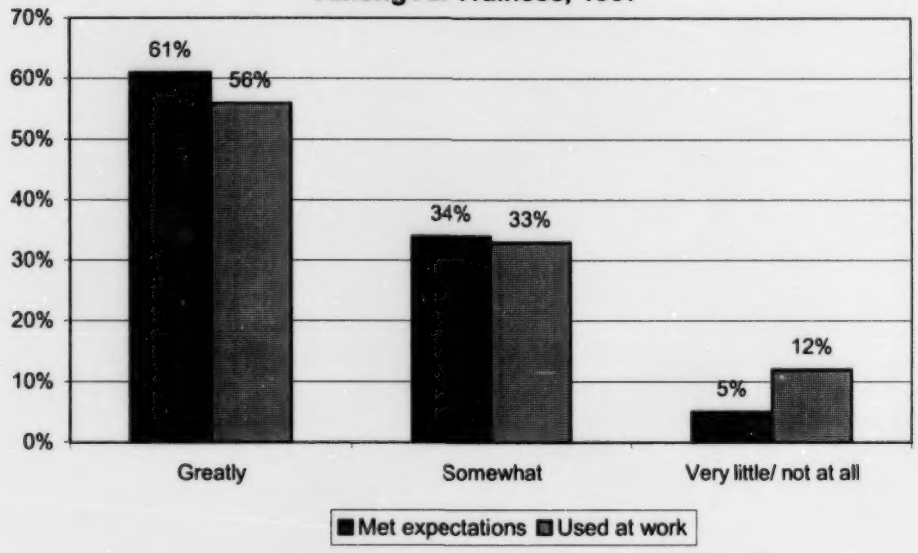
The analysis of this section relies on a subset of the AETS database that provides detailed information about each course taken by employees. The sample is restricted to employer sponsored courses.

Overall Training Success

Chart 9 shows that the majority of employees are satisfied with the employer courses they took. However, there is still significant room for improvement:

- In 39% of the cases, employer courses met only somewhat or less employee expectations.
- Also, in 44% of the cases, the acquired skills were used only somewhat or less at the work place.

Chart 9: Indicators of Success of Employer Courses Among All Trainees, 1997



Factors Affecting Training Success

Charts 10a to 10d, probe some of the factors that may contribute to a greater rate of success of employer training courses. The show that:

Who gave the course:

- Course that were given directly by the employer were more likely to be used at work and also had a higher rate of meeting employee expectations.
- Educational institutions (such as colleges and universities) were relatively more successful than commercial schools, both in terms of meeting employee expectations and being applied at the work place.

Who suggested the course:

- Whether a course was suggested by the employee or the employer, the rate of being used at work was about the same. However, employer courses were more likely to meet employee expectations when employees themselves suggested the training.

Duration of the course:

- Longer-term employer courses were more likely to provide skills that are greatly used at work, as well as meeting to a great extent the expectations of the employees.

Occupation of trainee:

- There is some variation of the indicators of training success by occupation. However the variation is rather limited. This suggest that training can be equally successful across occupations, while other factors -- such as who suggested the training or the duration of the training -- are more important factors.

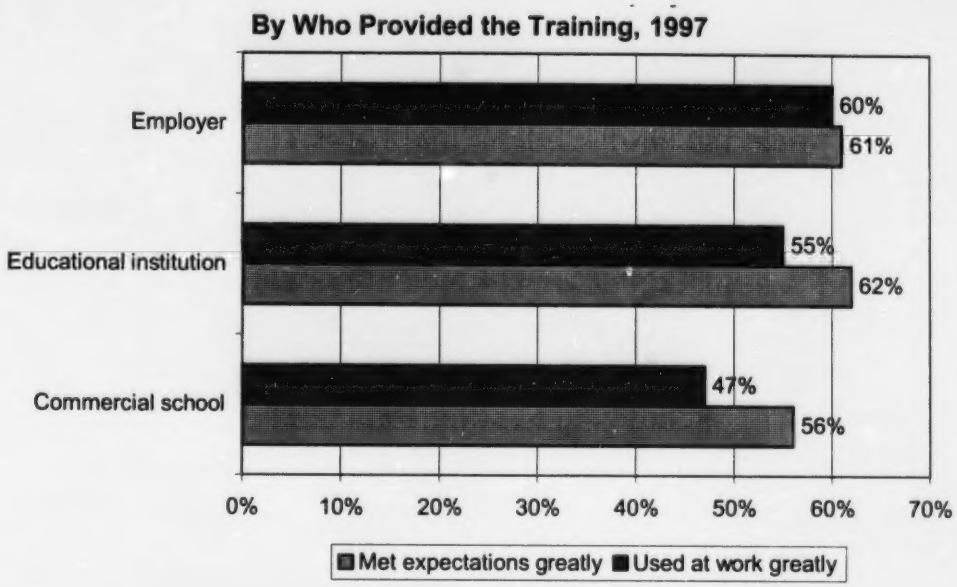


Chart 10b: Indicators of Success of Employer Courses, By Who Suggested the Training, 1997

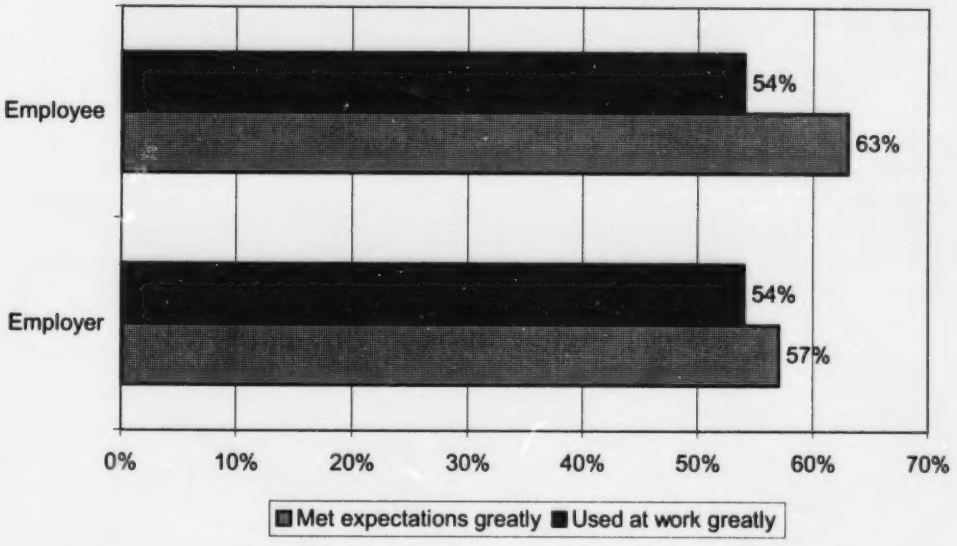


Chart 10c: Indicators of Success of Employer Courses, By Duration of the Course, 1997

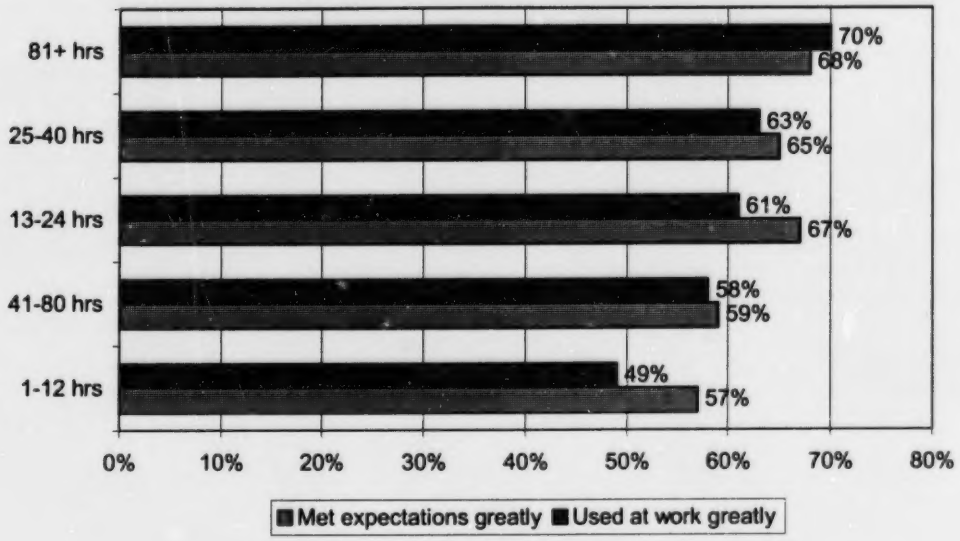
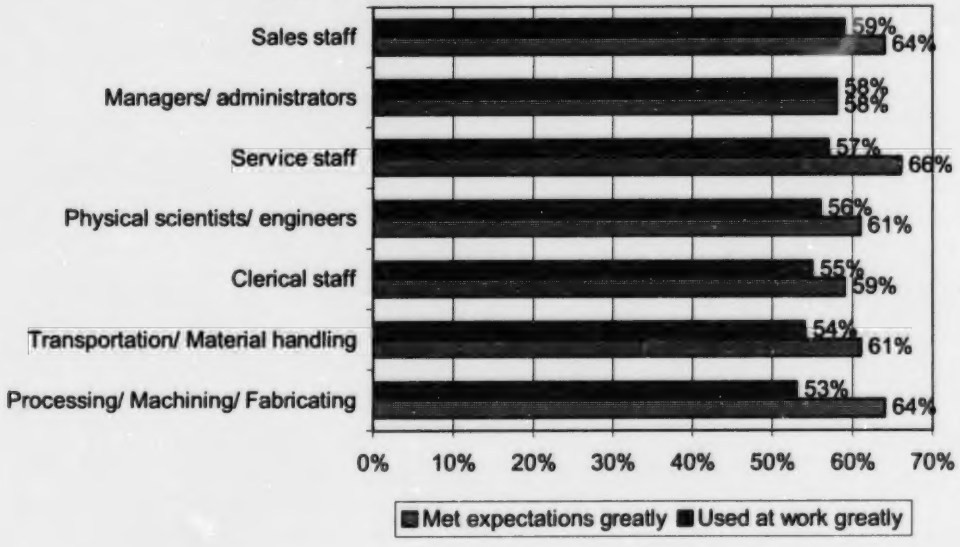


Chart 10d: Indicators of Success of Employer Courses, Among Selected Occupations, 1997



Trends in Training Market Shares

Finally, this section looks at trends in employer training market shares -- i.e. the distribution of employer course by place of delivery. In 1997, about 5.4 million courses were supported by employers, up from 4.3 million in 1993. Chart 11a shows that:

- about a quarter of all employer-supported training courses took place at the workplace in 1997;
- about another quarter took place mostly in public education institutions (like high schools, colleges, universities, and community centres);
- about one-third took place at mostly private sites -- e.g. conference centres, training centres and commercial schools; and
- the balance took place mostly in unspecified locations.

Looking at the change in market shares, colleges saw the largest increase in market shares -- almost a doubling from about 5% to about 10%. The largest decline was observed among conference centres/hotels (6%) and the workplace (9%).

The above shifts possibly suggest also a shift in the nature of employer-supported training: away from typically less formal training at the workplace or conferences, into more traditional courses, including colleges, universities, and public schools.

Chart 11a: Distribution of Employer-Supported Courses by Place Where Training Took Place: 1993 vs. 1997

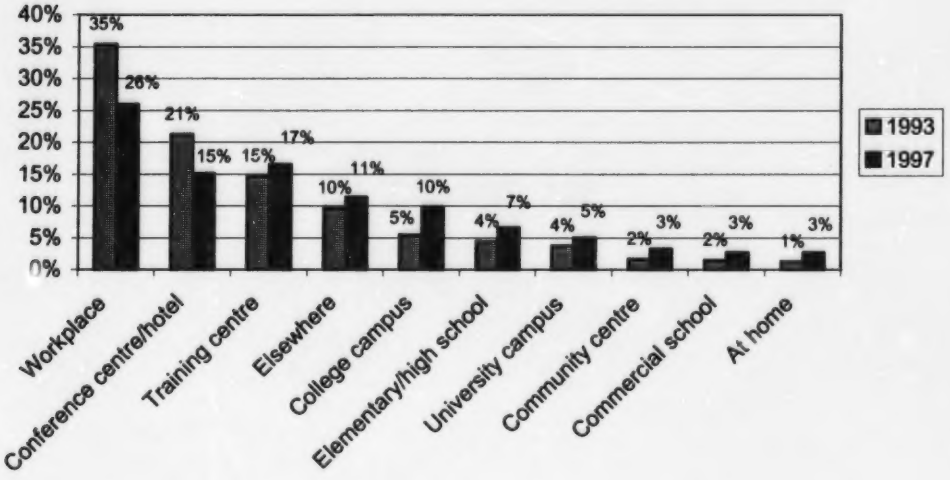
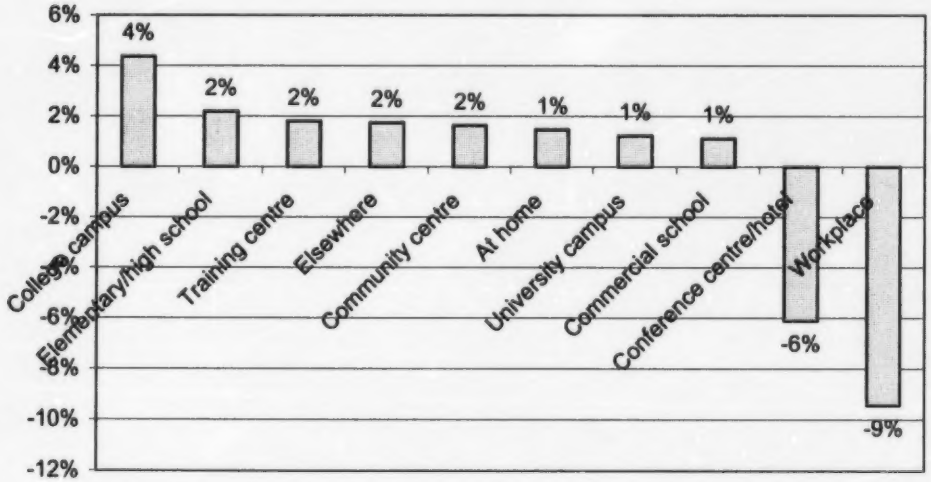


Chart 11b: Change in Distribution of Employer Courses by Place Where Training Took Place: 1993 vs. 1997



Conclusion

The results of the study suggest that the incidence of employer-supported training is high, particularly in the information and telecommunication technologies sector. However, most employer training tends to be short-term. This suggests that intensive training, including the type of training required to significantly upgrade skills or prepare employees for a change in career, takes place outside employer training.

Also, despite the high incidence of training -- both employer supported and own training -- there is still substantial unmet demand for training among employees. This indicates that there is still need for addressing common barriers to training -- such as lack of time, inconvenient time of courses, or financial considerations.

The results of the study show that it is important than in promoting training, industry and government reach out to employees. Not only a significant portion of training is taken by employees on their own, but even when they take employer-supported training often it is the employees who initiate the training.

Finally, there is a need for more in-depth studying of what types of training work best. Employee training is already a multibillion investment. And while maintaining a high level of investment is important, it is equally important that available funds are invested as efficiently as possible. Surveys, like the AETS, provide an insight into what types of training are more appropriate for different types of employees.

Appendix I: Sample Size -- Detailed Tables

Table A1: Sample Size of Selected Sectors

Aerospace	**74**
321 Aircraft and Aircraft Parts Industry	52
452 Service Industries Incidental to Air Transport	22
Automotive	**293**
151 Tire and Tube Industry	23
323 Motor Vehicle Industry	118
324 Truck and Bus Body and Trailer Industries	32
325 Motor Vehicle Parts and Accessories Industries	120
Information/Telecommunication Technologies	**363**
335 Communication and Other Electronic Equipment Indus	69
336 Office, Store and Business Machine Industries	23
338 Communications and Energy Wire and Cable Industry	9
482 Telecommunication Carriers Industry	148
772 Computer and Related Services	114
Biotechnology	**36**
372 Agricultural Chemical Industries	10
374 Pharmaceutical and Medicine Industry	26
Environmental	**33**
591 Waste Materials, Wholesale	33
All selected sectors	**799**

Table A2: Sample Size of Selected Occupations	
Managers (science/manufacturing)	**332**
1131 Management Occupations, Natural Sciences and Engineering	51
1135 Financial Management Occupations	139
1137 Sales and Advertising Management Occupations	15
1143 Production Management Occupations	89
2311 Economists	18
8510 Foremen/women: Fabricating and Assembling Occupations	20
Scientists (physics, chemistry, etc)	**36**
2111 Chemists	19
2112 Geologists	6
2113 Physicists	1
2133 Biologists and Related Scientists	10
Engineers (mechanical, telecom etc)	**345**
2142 Chemical Engineers	6
2143 Civil Engineers	33
2144 Electrical Engineers	46
2145 Industrial Engineers	24
2147 Mechanical Engineers	27
2155 Aerospace Engineers	4
2183 Systems Analysts, Computer Programmers and Related Occu	205
Technicians and technologists	**119**
2117 Physical Sciences Technologists and Technicians	32
2135 Life Sciences Technologists and Technicians	20
2165 Engineering Technologists and Technicians	62
8539 Fabricating, Assembling, Installing and Repairing Occup	5
Skilleds trades (machining/tool making)	**331**
8311 Tool and Die Making Occupations	21
8313 Machinist and Machine Tool Setting-up Occupations	56
8533 Electrical and Related Equipment Installing and Repairi	60
8582 Aircraft Mechanics and Repairers	15
8584 Industrial, Farm and Construction Machinery Mechanics a	179
Assembly (aircraft/motor/plastics)	**143**
8513 Motor Vehicle Fabricating and Assembling Occupations, n	63
8515 Aircraft Fabricating and Assembling Occupations, nec	10
8570 Foremen/women: Fabricating, Assembling and Repairing O	10
8571 Bonding and Cementing Occupations: Rubber, Plastic and	8
8573 Moulding Occupations: Rubber, Plastic and Related Prod	6
8575 Cutting and Finishing Occupations: Rubber, Plastic and	3
8576 Inspecting, Testing, Grading and Sampling Occupations:	4
8578 Occupations in Labouring and Other Elemental Work: Fab	9
8579 Fabricating, Assembling and Repairing Occupations: Rub	30
All selected sectors	**1,306**

Appendix II: Incidence and Adequacy of Training – Regressions

Dependent Variables

- logit(ANYET) Incidence of any type of training
- logit(EMPET) Incidence of any type of training
- logit(OWNET) Incidence of any type of training
- logit(GADEQ) Percentage who feel that employer training is adequate
- logit(NEEDWANT) Percentage who feel they need/want more training

Independent Variables

NSIC3 (Sectors)

(1) Aerospace
(2) Automotive
(3) Information/Telecommunication Technologies
(4) Rest of the economy (reference category)

GSOC4 (Occupation)

(1) Managers
(2) Engineers
(3) Technicians/Technologists
(4) Skilled Trades
(5) Assembly Workers
(6) Rest of the economy (reference category)

Interpretation of Logit Regression Results

The results of logit regression are more difficult to interpret than ordinary least squares regression. Here is an simplified explanation of two of the key logit statistics:

- **Exp(B)**: if the coefficient is 1, this means that the particular category (e.g. industry = aerospace) has no effect relative to the reference category (i.e. the rest of the economy). If it is greater than one, it has a positive effect, and vice versa.
- **Sig**: If the sigma coefficient is less than 0.05, the Exp(B) coefficient is statistically significant. For example, if Exp(B) is 1.2 and Sig<0.05, this means there is an at least 95% probability that the effect of aerospace has a positive effect on the incidence of training.

Dependent Variable.. ANYET % Who Received Any Training

Variable	B	S.E.	Wald	df	Sig	R	Exp(B)
NSIC3			23.4282	3	.0000	.0293	
NSIC3(1)	-.4101	.2167	3.5797	1	.0585	-.0088	.6636
NSIC3(2)	-.1451	.1222	1.4101	1	.2350	.0000	.8649
NSIC3(3)	.3998	.0951	17.6863	1	.0000	.0278	1.4915
GSOC4			75.0914	5	.0000	.0567	
GSOC4(1)	.2062	.1071	3.7064	1	.0542	.0092	1.2291
GSOC4(2)	.6507	.1001	42.2796	1	.0000	.0446	1.9169
GSOC4(3)	.1612	.1784	.8162	1	.3663	.0000	1.1749
GSOC4(4)	-.0778	.1189	.4280	1	.5130	.0000	.9252
GSOC4(5)	-1.1782	.2253	27.3463	1	.0000	-.0354	.3078
Constant	-.3676	.0178	428.8461	1	.0000		

Number of cases included in the analysis: 14914

Dependent Variable.. EMPET % Who Received Employer Training

Variable	B	S.E.	Wald	df	Sig	R	Exp(B)
NSIC3			27.0168	3	.0000	.0347	
NSIC3(1)	-.2879	.2377	1.4677	1	.2257	.0000	.7498
NSIC3(2)	-.0121	.1324	.0083	1	.9273	.0000	.9880
NSIC3(3)	.4840	.0967	25.0546	1	.0000	.0363	1.6226
GSOC4			117.7464	5	.0000	.0786	
GSOC4(1)	.6132	.1092	31.5469	1	.0000	.0411	1.8464
GSOC4(2)	.8099	.0996	66.0917	1	.0000	.0606	2.2477
GSOC4(3)	.5776	.1818	10.0905	1	.0015	.0215	1.7818
GSOC4(4)	.2813	.1248	5.0802	1	.0242	.0133	1.3248
GSOC4(5)	-.9229	.2549	13.1066	1	.0003	-.0252	.3973
Constant	-1.0524	.0199	2795.178	1	.0000		

Number of cases included in the analysis: 14914

Dependent Variable.. OWNET % Who Received Training on their Own

Variable	B	S.E.	Wald	df	Sig	R	Exp(B)
NSIC3			4.6889	3	.1960	.0000	
NSIC3(1)	-.1224	.2815	.1892	1	.6635	.0000	.8848
NSIC3(2)	-.3731	.1750	4.5463	1	.0330	-.0132	.6886
NSIC3(3)	-.0278	.1223	.0518	1	.8199	.0000	.9725
GSOC4			35.5467	5	.0000	.0419	
GSOC4(1)	-.5179	.1598	10.5070	1	.0012	-.0242	.5958
GSOC4(2)	-.0082	.1247	.0043	1	.9476	.0000	.9918
GSOC4(3)	-.6873	.2838	5.8669	1	.0154	-.0163	.5029
GSOC4(4)	-.6372	.1819	12.2764	1	.0005	-.0266	.5288
GSOC4(5)	-.9530	.3173	9.0204	1	.0027	-.0219	.3856
Constant	-1.3954	.0219	4056.390	1	.0000		

Number of cases included in the analysis: 14914

Dependent Variable..GADEQ: %Who Feel Employer Training is Adequate

Variable	B	S.E.	Wald	df	Sig	R	Exp(B)
NSIC3			25.9541	3	.0000	.0317	
NSIC3(1)	.4591	.2193	4.3801	1	.0364	.0109	1.5826
NSIC3(2)	.6316	.1331	22.5292	1	.0000	.0322	1.8806
NSIC3(3)	.0513	.0991	.2674	1	.6051	.0000	1.0526
GSOC4			26.7497	5	.0001	.0290	
GSOC4(1)	.4030	.1171	11.8380	1	.0006	.0223	1.4963
GSOC4(2)	.4363	.1082	16.2620	1	.0001	.0268	1.5470
GSOC4(3)	-.0201	.1825	.0122	1	.9122	.0000	.9801
GSOC4(4)	-.0128	.1196	.0114	1	.9149	.0000	.9873
GSOC4(5)	.1104	.1897	.3388	1	.5605	.0000	1.1167
Constant	.4345	.0179	590.4456	1	.0000		

Number of cases included in the analysis: 14914

Dependent Variable..NEEDWANT: % Who Need/Want More Training

Variable	B	S.E.	Wald	df	Sig	R	Exp(B)
NSIC3			5.9208	3	.1155	.0000	
NSIC3(1)	-.5738	.2685	4.5692	1	.0326	-.0123	.5634
NSIC3(2)	.1266	.1327	.9108	1	.3399	.0000	1.1350
NSIC3(3)	-.0570	.1059	.2901	1	.5902	.0000	.9446
GSOC4			59.1158	5	.0000	.0539	
GSOC4(1)	.1543	.1188	1.6863	1	.1941	.0000	1.1669
GSOC4(2)	.6130	.1027	35.6092	1	.0000	.0446	1.8460
GSOC4(3)	.3229	.1921	2.8246	1	.0928	.0070	1.3811
GSOC4(4)	.1258	.1301	.9347	1	.3337	.0000	1.1341
GSOC4(5)	-1.2040	.2809	18.3754	1	.0000	-.0311	.3000
Constant	-1.0952	.0201	2959.381	1	.0000		

Number of cases included in the analysis: 14914

Appendix III: What Training Works Best -- Detailed Tables

A1. Indicators of Success of Employer Training Course
All Sectors

	MET EXPECT-ATIONS GREATLY	MET EXPECT-ATIONS SOMEWHT	MET EXPECT-ATIONS LITTLE	USED SKILLS AT WORK GREATLY	USED SKILLS AT WORK SOMEWHT	USED SKILLS AT WORK LITTLE	MET EXPECT AND USED GREATLY	MET EXPECT OR USED GREATLY
MAJOR OCCUPATIONAL GROUPS								
Managerial/ Administrative....	58%	38%	4%	58%	34%	7%	44%	72%
Natural sciences/ Engineers...	61%	35%	3%	56%	31%	13%	43%	75%
Clerical.....	59%	35%	6%	55%	32%	13%	42%	72%
Sales.....	64%	29%	7%	59%	30%	11%	49%	73%
Service.....	66%	27%	7%	57%	29%	14%	44%	78%
Processing/ Machining/ Fabric.	64%	32%	4%	53%	31%	16%	42%	75%
Transpo/ material handling....	61%	31%	7%	54%	32%	14%	42%	73%
All other occupations.....	62%	34%	5%	53%	34%	13%	42%	72%
PLACE OF TRAINING								
Public school/ campus.....	62%	32%	6%	50%	34%	17%	38%	73%
Commercial/ training centre...	62%	34%	5%	56%	32%	12%	43%	74%
At work.....	61%	34%	5%	60%	29%	11%	45%	75%
Conference centre.....	59%	37%	4%	55%	38%	7%	44%	70%
Elsewhere.....	64%	32%	5%	48%	38%	14%	39%	72%
BY EDUCATIONAL INSTITUTION								
Yes.....	62%	32%	6%	55%	33%	12%	43%	73%
No.....	61%	34%	5%	56%	32%	12%	43%	73%
BY COMMERCIAL SCHOOL								
Yes.....	56%	38%	6%	47%	38%	14%	37%	66%
No.....	62%	33%	5%	58%	31%	11%	45%	75%
BY EMPLOYER								
Yes.....	61%	35%	4%	60%	30%	10%	45%	75%
No.....	61%	34%	5%	53%	34%	13%	42%	72%
SUGGESTED BY EMPLOYEE								
Yes.....	63%	34%	3%	54%	37%	9%	44%	73%
No.....	60%	34%	6%	56%	31%	13%	43%	73%
SUGGESTED BY EMPLOYER								
Yes.....	57%	38%	5%	54%	33%	12%	40%	71%
No.....	69%	27%	4%	58%	32%	10%	49%	77%
MAIN REASON TOOK COURSE								
Current/future job.....	61%	34%	5%	57%	32%	10%	44%	74%
Personal interest.....	61%	33%	6%	31%	37%	32%	26%	65%
Other reasons.....	62%	30%	8%	47%	33%	20%	38%	70%
COURSE DURATION								
1-12 hrs.....	57%	37%	6%	49%	36%	14%	37%	68%
13-24 hrs.....	67%	31%	2%	61%	29%	9%	50%	79%
25-40 hrs.....	65%	31%	4%	63%	29%	8%	49%	78%
41-80 hrs.....	59%	35%	6%	58%	31%	11%	45%	72%
81+ hrs.....	68%	28%	4%	70%	21%	9%	53%	84%
ALL OCCUPATIONS.....	61%	34%	5%	56%	33%	12%	43%	73%

A2. Indicators of Success of Employer Training Course
By Major Sector

	MET EXPECT-ATIONS GREATLY	MET EXPECT-ATIONS SOMEWHT	MET EXPECT-ATIONS LITTLE	USED SKILLS AT WORK GREATLY	USED SKILLS AT WORK SOMEWHT	USED SKILLS AT WORK LITTLE	MET EXPECT AND USED GREATLY	MET EXPECT OR USED GREATLY
Managerial/ Administrative								
PLACE OF TRAINING								
Public school/ campus.....	64%	28%	8%	47%	42%	11%	33%	77%
Commercial/ training centre.	55%	40%	4%	57%	33%	9%	41%	71%
At work.....	57%	39%	4%	65%	28%	7%	48%	73%
Conference centre.....	55%	41%	3%	57%	38%	4%	44%	68%
Elsewhere.....	67%	32%	1%	53%	40%	7%	44%	75%
BY EDUCATIONAL INSTITUTION								
Yes.....	63%	32%	5%	59%	35%	6%	44%	77%
No.....	57%	40%	3%	58%	34%	8%	44%	71%
BY COMMERCIAL SCHOOL								
Yes.....	56%	41%	4%	52%	41%	7%	36%	71%
No.....	59%	37%	4%	61%	32%	7%	46%	73%
BY EMPLOYER								
Yes.....	59%	37%	4%	63%	30%	6%	48%	73%
No.....	58%	39%	4%	56%	37%	8%	41%	72%
SUGGESTED BY EMPLOYEE								
Yes.....	58%	38%	4%	57%	38%	5%	42%	73%
No.....	58%	38%	4%	59%	33%	8%	44%	72%
SUGGESTED BY EMPLOYER								
Yes.....	55%	42%	3%	58%	34%	8%	42%	70%
No.....	64%	31%	5%	59%	35%	6%	46%	76%
COURSE DURATION								
1-12 hrs.....	52%	45%	2%	55%	38%	7%	38%	68%
13-24 hrs.....	64%	35%	1%	63%	33%	5%	50%	76%
25-40 hrs.....	58%	35%	7%	58%	33%	9%	44%	72%
41-80 hrs.....	59%	31%	10%	60%	29%	11%	47%	72%
81+ hrs.....	68%	25%	7%	68%	25%	7%	53%	82%

A2. Indicators of Success of Employer Training Course
By Major Sector (Cont'd)

	MET EXPECT-ATIONS GREATLY	MET EXPECT-ATIONS SOMEWHT	MET EXPECT-ATIONS LITTLE	USED SKILLS AT WORK GREATLY	USED SKILLS AT WORK SOMEWHT	USED SKILLS AT WORK LITTLE	MET EXPECT AND USED GREATLY	MET EXPECT OR USED GREATLY
Natural sciences/ Engineers								
PLACE OF TRAINING								
Public school/ campus	64%	24%	11%	44%	35%	21%	41%	67%
Commercial/ training centre.	69%	29%	2%	56%	25%	19%	45%	80%
At work	57%	40%	4%	61%	29%	10%	42%	75%
Conference centre	56%	44%	0%	56%	36%	8%	41%	71%
Elsewhere	73%	22%	5%	43%	51%	6%	43%	74%
BY EDUCATIONAL INSTITUTION								
Yes	62%	31%	7%	53%	27%	20%	41%	74%
No	61%	36%	2%	57%	32%	11%	43%	75%
BY COMMERCIAL SCHOOL								
Yes	58%	40%	3%	48%	34%	17%	40%	66%
No	62%	34%	4%	58%	30%	11%	43%	77%
BY EMPLOYER								
Yes	62%	35%	3%	58%	35%	8%	45%	75%
No	61%	35%	4%	55%	30%	15%	41%	75%
SUGGESTED BY EMPLOYEE								
Yes	63%	34%	3%	53%	39%	8%	43%	72%
No	61%	36%	3%	58%	27%	15%	42%	76%
SUGGESTED BY EMPLOYER								
Yes	53%	43%	4%	55%	31%	14%	36%	72%
No	75%	22%	3%	59%	31%	10%	54%	80%
COURSE DURATION								
1-12 hrs	53%	43%	4%	45%	44%	12%	32%	66%
13-24 hrs	63%	34%	3%	58%	24%	17%	44%	78%
25-40 hrs	84%	16%	0%	70%	26%	5%	66%	87%
41-80 hrs	64%	34%	2%	76%	8%	16%	55%	85%
81+ hrs	49%	50%	1%	65%	22%	13%	35%	79%

A2. Indicators of Success of Employer Training Course
By Major Sector (Cont'd)

	MET EXPECT-ATIONS GREATLY	MET EXPECT-ATIONS SOMEWHT	MET EXPECT-ATIONS LITTLE	USED SKILLS AT WORK GREATLY	USED SKILLS AT WORK SOMEWHT	USED SKILLS AT WORK LITTLE	MET EXPECT AND USED GREATLY	MET EXPECT OR USED GREATLY
Clerical								
PLACE OF TRAINING								
Public school/ campus.....	60%	38%	3%	59%	26%	15%	47%	69%
Commercial/ training centre.	51%	39%	10%	48%	39%	12%	32%	67%
At work.....	60%	35%	5%	56%	30%	14%	43%	73%
Conference centre.....	69%	23%	9%	58%	29%	13%	50%	77%
Elsewhere.....	60%	34%	6%	54%	36%	10%	38%	75%
BY EDUCATIONAL INSTITUTION								
Yes.....	62%	32%	6%	56%	29%	15%	47%	70%
No.....	58%	35%	6%	55%	32%	13%	40%	72%
BY COMMERCIAL SCHOOL								
Yes.....	54%	34%	11%	49%	34%	16%	37%	66%
No.....	61%	35%	4%	57%	31%	12%	43%	74%
BY EMPLOYER								
Yes.....	63%	35%	2%	61%	28%	11%	46%	77%
No.....	57%	35%	9%	50%	35%	15%	39%	68%
SUGGESTED BY EMPLOYEE								
Yes.....	60%	39%	1%	50%	35%	15%	42%	67%
No.....	59%	34%	7%	56%	31%	13%	42%	73%
SUGGESTED BY EMPLOYER								
Yes.....	55%	38%	7%	53%	35%	13%	37%	70%
No.....	69%	27%	3%	61%	25%	14%	52%	76%
COURSE DURATION								
1-12 hrs.....	57%	35%	8%	52%	31%	17%	40%	69%
13-24 hrs.....	61%	37%	2%	58%	33%	9%	40%	79%
25-40 hrs.....	54%	43%	2%	52%	45%	3%	32%	72%
41-80 hrs.....	49%	42%	9%	44%	42%	14%	33%	60%
81+ hrs.....	92%	8%	0%	95%	4%	1%	89%	96%

A2. Indicators of Success of Employer Training Course
By Major Sector (Cont'd)

	MET EXPECT-ATIONS GREATLY	MET EXPECT-ATIONS SOMEWHT	MET EXPECT-ATIONS LITTLE	USED SKILLS AT WORK GREATLY	USED SKILLS AT WORK SOMEWHT	USED SKILLS AT WORK LITTLE	MET EXPECT AND USED GREATLY	MET EXPECT OR USED GREATLY
Sales								
PLACE OF TRAINING								
Public school/ campus.....	64%	30%	6%	44%	18%	37%	38%	69%
Commercial/ training centre.	63%	31%	6%	59%	28%	13%	49%	71%
At work.....	66%	24%	9%	62%	31%	7%	52%	75%
Conference centre.....	67%	30%	4%	73%	23%	3%	58%	81%
Elsewhere.....	56%	33%	11%	39%	43%	18%	34%	61%
BY EDUCATIONAL INSTITUTION								
Yes.....	65%	29%	6%	47%	43%	10%	36%	75%
No.....	63%	29%	8%	62%	27%	11%	51%	72%
BY COMMERCIAL SCHOOL								
Yes.....	52%	37%	11%	49%	38%	13%	40%	59%
No.....	68%	26%	6%	63%	27%	10%	52%	78%
BY EMPLOYER								
Yes.....	55%	39%	6%	53%	40%	7%	41%	66%
No.....	66%	26%	8%	61%	27%	12%	51%	75%
SUGGESTED BY EMPLOYEE								
Yes.....	63%	30%	7%	54%	31%	14%	47%	69%
No.....	64%	29%	7%	61%	29%	10%	49%	74%
SUGGESTED BY EMPLOYER								
Yes.....	58%	35%	7%	56%	35%	10%	43%	69%
No.....	74%	19%	8%	66%	21%	13%	60%	79%
COURSE DURATION								
1-12 hrs.....	62%	29%	9%	49%	38%	13%	43%	66%
13-24 hrs.....	70%	28%	2%	84%	11%	6%	63%	91%
25-40 hrs.....	70%	24%	6%	74%	17%	9%	62%	80%
41-80 hrs.....	51%	37%	11%	39%	50%	11%	35%	55%
81+ hrs.....	46%	44%	9%	49%	31%	20%	25%	71%

A2. Indicators of Success of Employer Training Course
By Major Sector (Cont'd)

	MET EXPECT-ATIONS GREATLY	MET EXPECT-ATIONS SOMEWHT	MET EXPECT-ATIONS LITTLE	USED SKILLS AT WORK GREATLY	USED SKILLS AT WORK SOMEWHT	USED SKILLS AT WORK LITTLE	MET EXPECT AND USED GREATLY	MET EXPECT OR USED GREATLY
Service								
PLACE OF TRAINING								
Public school/ campus.....	55%	38%	8%	51%	38%	11%	27%	77%
Commercial/ training centre.	82%	13%	4%	67%	22%	12%	55%	93%
At work.....	64%	30%	6%	57%	28%	15%	44%	76%
Conference centre.....	49%	35%	16%	42%	45%	13%	37%	54%
Elsewhere.....	73%	22%	5%	58%	22%	20%	45%	84%
BY EDUCATIONAL INSTITUTION								
Yes.....	60%	30%	10%	55%	37%	8%	41%	72%
No.....	67%	26%	6%	57%	28%	15%	45%	79%
BY COMMERCIAL SCHOOL								
Yes.....	50%	39%	11%	34%	48%	18%	24%	60%
No.....	69%	25%	6%	61%	25%	14%	48%	82%
BY EMPLOYER								
Yes.....	70%	25%	5%	65%	22%	12%	52%	83%
No.....	62%	29%	9%	47%	36%	16%	35%	73%
SUGGESTED BY EMPLOYEE								
Yes.....	71%	26%	4%	52%	34%	14%	48%	74%
No.....	65%	27%	7%	58%	28%	14%	43%	79%
SUGGESTED BY EMPLOYER								
Yes.....	64%	28%	7%	59%	28%	13%	44%	79%
No.....	71%	24%	5%	52%	31%	17%	45%	77%
COURSE DURATION								
1-12 hrs.....	61%	29%	10%	51%	30%	19%	37%	74%
13-24 hrs.....	76%	20%	4%	67%	22%	12%	59%	84%
25-40 hrs.....	64%	35%	1%	64%	27%	9%	48%	79%
41-80 hrs.....	71%	26%	3%	80%	20%	0%	57%	93%
81+ hrs.....	79%	15%	6%	60%	24%	17%	46%	89%

A2. Indicators of Success of Employer Training Course
By Major Sector (Cont'd)

	MET EXPECT-ATIONS GREATLY	MET EXPECT-ATIONS SOMEWHT	MET EXPECT-ATIONS LITTLE	USED SKILLS AT WORK GREATLY	USED SKILLS AT WORK SOMEWHT	USED SKILLS AT WORK LITTLE	MET EXPECT AND USED GREATLY	MET EXPECT OR USED GREATLY
Processing/ Machining/ Fabric								
PLACE OF TRAINING								
Public school/ campus	59%	36%	6%	48%	18%	34%	29%	77%
Commercial/ training centre	71%	27%	2%	62%	29%	9%	51%	82%
At work	65%	29%	6%	51%	36%	13%	41%	74%
Conference centre	54%	45%	1%	57%	23%	20%	43%	68%
Elsewhere	57%	39%	4%	45%	33%	22%	33%	69%
BY EDUCATIONAL INSTITUTION								
Yes	65%	29%	6%	58%	28%	14%	44%	79%
No	64%	32%	4%	52%	32%	16%	41%	75%
BY COMMERCIAL SCHOOL								
Yes	58%	41%	1%	38%	33%	29%	30%	66%
No	66%	29%	5%	57%	31%	12%	45%	78%
BY EMPLOYER								
Yes	62%	34%	4%	58%	33%	10%	43%	76%
No	66%	30%	4%	50%	30%	20%	41%	75%
SUGGESTED BY EMPLOYEE								
Yes	68%	31%	1%	50%	31%	19%	43%	76%
No	64%	32%	5%	54%	31%	15%	42%	75%
SUGGESTED BY EMPLOYER								
Yes	61%	36%	3%	50%	33%	17%	36%	74%
No	72%	20%	7%	60%	28%	12%	54%	78%
COURSE DURATION								
1-12 hrs	60%	33%	6%	41%	39%	20%	32%	69%
13-24 hrs	67%	30%	3%	54%	28%	18%	48%	73%
25-40 hrs	66%	33%	1%	77%	16%	7%	52%	90%
41-80 hrs	58%	38%	4%	58%	36%	6%	33%	82%
81+ hrs	82%	18%	0%	87%	8%	6%	77%	91%

A2. Indicators of Success of Employer Training Course
By Major Sector (Cont'd)

	MET EXPECT-ATIONS GREATLY	MET EXPECT-ATIONS SOMEWHT	MET EXPECT-ATIONS LITTLE	USED SKILLS AT WORK GREATLY	USED SKILLS AT WORK SOMEWHT	USED SKILLS AT WORK LITTLE	MET EXPECT AND USED GREATLY	MET EXPECT OR USED GREATLY
Transpo/ material handling								
PLACE OF TRAINING								
Public school/ campus.....	69%	14%	18%	59%	17%	24%	59%	69%
Commercial/ training centre.	62%	35%	4%	36%	49%	15%	31%	67%
At work.....	63%	29%	8%	65%	22%	14%	50%	78%
Conference centre.....	38%	49%	13%	39%	45%	16%	13%	63%
Elsewhere.....	60%	37%	2%	27%	66%	8%	23%	64%
BY EDUCATIONAL INSTITUTION								
Yes.....	59%	32%	10%	56%	23%	22%	43%	71%
No.....	61%	31%	7%	53%	33%	13%	41%	73%
BY COMMERCIAL SCHOOL								
Yes.....	54%	35%	11%	43%	43%	14%	36%	60%
No.....	63%	30%	6%	56%	30%	14%	43%	76%
BY EMPLOYER								
Yes.....	62%	30%	8%	61%	27%	11%	47%	76%
No.....	60%	33%	7%	43%	39%	18%	34%	68%
SUGGESTED BY EMPLOYEE								
Yes.....	68%	26%	6%	47%	32%	21%	47%	68%
No.....	60%	32%	8%	55%	33%	13%	40%	74%
SUGGESTED BY EMPLOYER								
Yes.....	61%	31%	8%	58%	30%	12%	44%	74%
No.....	63%	32%	5%	40%	40%	20%	34%	69%
COURSE DURATION								
1-12 hrs.....	58%	33%	9%	51%	34%	15%	41%	68%
13-24 hrs.....	70%	23%	7%	59%	32%	9%	41%	87%
25-40 hrs.....	45%	49%	7%	59%	21%	20%	32%	72%
41-80 hrs.....	81%	19%	0%	56%	41%	4%	55%	82%
81+ hrs.....	100%	0%	0%	65%	17%	19%	65%	100%

A2. Indicators of Success of Employer Training Course
By Major Sector (Cont'd)

	MET EXPECT-ATIONS GREATLY	MET EXPECT-ATIONS SOMEWHT	MET EXPECT-ATIONS LITTLE	USED SKILLS AT WORK GREATLY	USED SKILLS AT WORK SOMEWHT	USED SKILLS AT WORK LITTLE	MET EXPECT AND USED GREATLY	MET EXPECT OR USED GREATLY
All other occupations								
PLACE OF TRAINING								
Public school/ campus.....	62%	34%	4%	49%	35%	16%	39%	72%
Commercial/ training centre.	58%	36%	5%	53%	33%	14%	43%	68%
At work.....	62%	33%	5%	60%	26%	13%	46%	75%
Conference centre.....	63%	34%	3%	50%	45%	5%	42%	71%
Elsewhere.....	62%	33%	5%	48%	35%	16%	38%	72%
BY EDUCATIONAL INSTITUTION								
Yes.....	61%	35%	5%	52%	35%	13%	42%	70%
No.....	62%	33%	4%	53%	34%	13%	42%	73%
BY COMMERCIAL SCHOOL								
Yes.....	60%	35%	5%	47%	37%	16%	39%	67%
No.....	62%	33%	4%	54%	34%	12%	43%	73%
BY EMPLOYER								
Yes.....	59%	36%	5%	55%	32%	13%	39%	72%
No.....	63%	32%	4%	52%	35%	13%	43%	72%
SUGGESTED BY EMPLOYEE								
Yes.....	68%	30%	2%	53%	40%	7%	46%	75%
No.....	59%	35%	5%	53%	32%	15%	41%	71%
SUGGESTED BY EMPLOYER								
Yes.....	57%	37%	6%	51%	34%	15%	38%	69%
No.....	70%	28%	2%	56%	35%	9%	49%	77%
ALL OCCUPATIONS.....	61%	34%	5%	56%	33%	12%	43%	73%
COURSE DURATION								
1-12 hrs.....	58%	37%	5%	47%	37%	16%	37%	68%
13-24 hrs.....	73%	25%	2%	59%	33%	8%	52%	80%
25-40 hrs.....	70%	25%	5%	62%	30%	8%	52%	80%
41-80 hrs.....	58%	39%	3%	56%	32%	12%	45%	68%
81+ hrs.....	63%	36%	1%	72%	23%	5%	49%	86%

Estimates based on the 1998 Adult Education and Training Survey

Appendix IV: References

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